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SPACE COUNTERSURVEILLANCE: A REQUISITE FOR THEATER DEFENSE PLANNING

by

Donald A. Meyer

Commander, U.S. Navy

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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The first "space war" has been successfully fought hundreds of miles above the sands of the Middle East, and U.S. "space warriors" are now contemplating future conflicts and how space can better contribute to operational success on the battlefield. However, the lessons of U.S. space dominance during Desert Storm also received much attention from other nations -- many of which U.S. forces may someday face in a future skirmish. These nations have learned the value of space assets and are busily seeking to acquire a space surveillance capability of their own. The U.S. national military strategy calls for its forces to exercise "space control" and deny potential enemies use of the space medium when necessary -- but does the U.S. possess the weapons and plans to successfully accomplish this task? This paper examines both U.S. and enemy capabilities in the space warfare realm. Further, it suggests that the U.S. can better organize its space warfare personnel under a "Space Component Commander" concept to successfully accomplish the space

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Abstract of

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CHAPTER I

INTRODUCTION

DESERT STORM -- THE FIRST SPACE WAR

Only two and one-half years ago, United States ground, naval, air and space forces scored an overwhelming military success during Operation Desert Storm against Iraqi Forces in the deserts of the Arabian peninsula. By the end of the war in February 1991, space system support had become widely recognized as a critical, valuable and necessary element of joint operations. Reflecting on that recognition, Desert Storm has been called the first "space war," because almost every aspect of military operations depended to some degree on space support systems.[1]

However, U.S. forces were confronting an enemy that did not possess equal access to the unique capabilities provided by weather, communications and reconnaissance satellites operating in warfare's fourth dimension -- that of space. Indeed, while Iraq relied extensively upon commercially available satellite imagery during its 1980-1988 war with Iran, representatives of the Iraqi government were unable to purchase Middle East imagery during Operation Desert Storm because of the United Nations embargo on trade with Iraq.[2] This fact did not go unrecognized

by the leaders of the U.S. space warfare community. General Donald J. Kutyna, USAF, who was Commander-in-Chief of the United States Space Command during Operation Desert Storm said the following in a prepared statement to the Senate Armed Services Committee shortly after the war's conclusion:

> "During Desert Storm, the allied coalition was able to covertly reposition forces immediately before the ground-combat phase began because the Iraqis did not have an aerial surveillance capability. This move allowed allied forces to completely surprise Iraqi ground forces with minimal casualties. We could not have done this against an adversary equipped with reconnaissance satellites unless we denied the enemy the use of his satellites. This obviously argues for an anti-satellite capability."[3]

A year later U.S. Space Command's Deputy Commander-in-Chief reiterated the same point stating:

> ..."the United States must be able to protect its space systems and selectively deny the use of space to an adversary. Perhaps the biggest difference between the Gulf War and one of the future will be facing an enemy that has its own space capability or access to it from a third party. General H. Norman Schwartzkopf's end run around Iraqi forces would not have been a surprise if Saddam Hussein had access to space-based intelligence or surveillance systems. Others will also learn the lessons of Desert Storm regarding space support to military operations; thus, an anti-satellite system is needed if the United States is to hold and exploit the "high ground" in future military operations. Ultimately, to control the sky above the battlefield, one must also control the space above the battlefield. As with the former, the latter will save lives, as well."[4]

Thus, the threat has been recognized -- proliferation of satellite reconnaissance technology or products derived from space reconnaissance amongst the nations of the world, many of which might someday pose a threat to U.S. forces, might well erode a significant U.S. advantage on the battlefield of tomorrow.

NATIONAL MILITARY STRATEGY VIS-A-VIS SPACE

The U.S. National Military Strategy directs that space forces be able to accomplish four tasks: space control (combat against enemy forces in space and their infrastructure); force application (combat against enemy land, sea, air and missile forces); force enhancement (support for land, sea and air forces); and space support (satellite control and launch capability).[5] Space control is analogous to sea control. It is control over lines of communication and the freedom of passage to, in and from the space environment. There are two purposes for securing control of space: first, to exploit the environment for the free exercise of on-orbit forces, second, to deny the use of the medium to the enemy.[6]

SPACE WARFARE AND THE OPERATIONAL COMMANDER

This paper will focus primarily on the second aspect of space control -- space denial and why operational planners must be prepared to cope with the proliferation of space reconnaissance systems, possible countermeasures to enemy space surveillance available in the space warfare portfolio, and finally, a discussion of how space operational planners can be integrated into a joint staff for planning and execution of the operational art of space warfare.

CHAPTER II

PROLIFERATION, THE "THREAT" AND SPACE WARFARE

PROLIFERATION OF SPACE TECHNOLOGY

The term "proliferation" in today's world conjures up images of nuclear and ballistic missile technologies being offered for sale legitimately or illegitimately, or perhaps stolen -- a transfer from the "haves" to the "have nots." One area of proliferation that often goes unnoticed is the transfer of space technology. Smaller powers seem inclined here as in other technological areas to follow the trails that the superpowers have blazed.[7] Indeed, space systems, technology and products are proliferating around the world. In the coming decades, U.S. forces may have to contend with the space-based combat support and possibly with combat capabilities of an array of foreign nations. The shift from the bipolar structure of international politics, which characterized the Cold War, toward multipolarity is being reflected in space.[8] This acquisition of space technology by rising regional powers will significantly alter the circumstances U.S. forces will encounter when facing future conflict.[9] As stated bluntly by General Kutyna:

> "Just as we would not tolerate enemy reconnaissance aircraft flying over our forces, we must not allow any enemy satellites to provide militarily useful data from space in wartime. Our forces obviously need a capability to counter this threat."[10]

To glean an understanding of the space threat, one must examine the technology that is currently commercially available

on the international market, who the sellers are, and what space-related systems nations are attempting to purchase. In general, most commercial imagery is purchased from the United States, Russia and France. This imagery ranges in resolution from between two to 30-meters. (Two-meter resolution imagery would permit a general identification of troop units while 30-meter resolution allows for detection of airfields, ports and harbors.) It has been estimated that imagery with a resolution of one-meter will be the commercial standard by the end of the century. With near-real-time access to such high-resolution data, satellite-derived information could be used to provide targeting data to military forces, to evaluate strikes (bomb damage assessment (BDA)) and to plan follow-on attacks.[11] Countries with significant space reconnaissance programs that are available to third parties are described below.

UNITED STATES

Indisputably, the world's leader in space reconnaissance technology is the United States. Indeed, the U.S. government has been approached by the United Arab Emirates, Spain and South Korea regarding the possibility of purchasing reconnaissance satellites.[12] These countries are seeking technology above and beyond that already available through the U.S. commercial firm Earth Observation Satellite Company (EOSAT) which controls the remote land sensing satellites LANDSAT 4 and 5. LANDSAT's multispectral 30-meter resolution imagery is available for

purchase in hard copy at $200 to $4400 per image[13], or a nation can contract to have its own LANDSAT ground station on sovereign territory to receive imagery direct from the satellite. LANDSAT photos were used extensively by allied forces during Operation Desert Storm, in particular to provide up-to-date maps of Kuwait City and to examine hydrographic features of coastal areas in the Arabian Gulf. Some of the countries in which ground stations are already located are Ecuador, Saudi Arabia, Brazil, Indonesia, Pakistan, China and Thailand. An improved LANDSAT with better resolution capability is being developed for launch in the near future. U.S. policymakers are currently debating whether U.S. firms should be able to sell more advanced reconnaissance satellites or satellite-derived imagery abroad.

CIS/RUSSIA

Russia is now offering to sell commercially, photographs from its once secret military photographic reconnaissance satellites. These images have a resolution of two-meters. Previously, Moscow was selling five-meter resolution photos through its Soyuzkarta commercial agency. The newly available photographs must be purchased through a designated commercial agent -- one of which is Central Trading Systems of Arlington, Va. The images sell for $3180 each and geographic coverage is nearly global. Although not available in near-real-time, the Russians will provide imagery of a new target 45-days after contracted.[14] CIS military satellites currently in orbit are

known to collect high-resolution imagery (better than the two-meter resolution available commercially), ocean reconnaissance data and electronic intelligence (ELINT).[15] Obviously such data could be made available to nations hostile to the U.S. should the Russian leadership so decide. In that regard, there has been some speculation that during the Falklands War in 1983 the Soviets were providing electronic reconnaissance locating data on British forces to the Argentines.

Additionally, in 1991, the former Soviet Ministry of Defense was offering its large secret Military Satellite Control Center for lease to any non-Soviet group for use to command commercial or scientific space missions. The Soviet facility controls CIS strategic reconnaissance, electronic intelligence and other military satellites and routinely participated in Soviet anti-satellite exercises to develop systems that could shoot down U.S. spacecraft. At the time, a Russian Air Force colonel stated "the concept is the same as if the U.S. Air Force were to offer to rent out its secret satellite control facility at Sunnyvale, California."[16] Needless to say in view of the foregoing, with the current fiscal crisis in the former Soviet Union, one can only speculate what reconnaissance technology might be sold abroad for hard currency.

FRANCE/EUROPEAN COMMUNITY

France currently operates the SPOT multispectral imagery system which produces images with a 10-meter resolution. The

French images can be purchased commercially through SPOT Image, the operator of the SPOT system for about $700 to $3000 each.[17] As with LANDSAT, several countries have purchased ground stations to receive SPOT imagery direct from the satellite. Among the countries with this capability are China, Thailand, Saudi Arabia, Pakistan, Brazil and Japan.

France was greatly impressed with the capabilities of U.S. reconnaissance and communications satellites during Operation Desert Storm and as a result has embarked on a large-scale military space program with several European partners. Significantly, responsibility for development of its growing military space operations is being transferred to the French civilian space agency. Among the satellites being developed are:

-- **HELIOS:** The first of at least two new imaging reconnaissance satellites based on SPOT is set for launch in 1994. The project also involves Italy and Spain. Imagery from the French space program will be provided to analysts at Europe's first space reconnaissance center, operated by the Western European Union (WEU) in Torrejon, Spain. The facility will practice imagery interpretation techniques utilizing SPOT imagery until the higher resolution HELIOS data are available[18] (reportedly sufficient to resolve a baseball-bat size object).[19]

-- **CERISE:** An experimental electronic intelligence satellite which will be launched on the same European Space Agency Ariane booster carrying HELIOS.[20]

-- **ZENON:** A large operational ELINT satellite that would

become operational early in the 21st century.[21]

-- **OSIRIS:** A military imaging radar spacecraft that would enter service about 2000 to provide a night/all-weather complement to the traditional imaging data from HELIOS. OSIRIS would be similar to the USAF/Central Intelligence Agency (CIA) radar spacecraft already operational.[22]

If these new spacecraft are successfully developed and launched, they could provide France and the WEU with the type of intelligence currently possessed only by the U.S. and Russia.[23] At their government's discretion, such militarily useful information could also be made available commercially to third party users.

CHINA

China, which has yet to orbit a signals intelligence satellite, has been a participant in satellite imagery reconnaissance since at least 1970 and orbited 12 satellites associated with military photoreconnaissance between 1970 and 1989.[24] On at least one occasion, the Chinese have attempted to improve on their film-return (via capsule from the spacecraft) imagery system by using a sensor to scan/process images in the satellite and transmit them directly to earth (thus providing a limited near-real-time capability).[25] Space missions in 1992, including a new military reconnaissance/earth resources satellite design suggest that China is advancing its civil/military earth imaging programs and has developed both the skilled manpower and

space hardware necessary to prepare multiple space launches simultaneously.[26] Given the propensity of the Chinese to export arms and arms-related technology, China's participation in the export of space-related technology sales to third parties should be anticipated.

OTHER NATIONS

-- **ISRAEL:** Israel began its space reconnaissance program in 1988 and has orbited two satellites which are believed to be photographic reconnaissance related.[27]

-- **INDIA:** India has an active space program and is developing a series of space launch vehicles, one of which will be capable of placing a large paylcad in low earth orbit.[28] India already employs remote sensing satellites with 36 to 72 meter resolution and work is progressing on a follow-on generation of satellites which will offer resolution similar to SPOT.[29]

-- **JAPAN:** Japan has orbited and operated earth resources satellites. Given their technological capacity, the Japanese could well develop satellites with militarily useful resolutions within the decade.

-- **PAKISTAN, INDONESIA, BRAZIL, TAIWAN, SOUTH KOREA, and SOUTH AFRICA:** These nations have also demonstrated the technologic capability to build or operate satellites for communications or reconnaissance tasks.[30]

Hence it is apparent that even today the space operational

planner confronts a real threat from the proliferation of military and commercial space-based reconnaissance technology. As briefly described in the data presented above, that threat is not contracting, but expanding -- potential foes are seeking to develop, purchase, operate and exploit the increasingly capable systems available to use the battlefield of space to gain a military advantage.

CHAPTER III

COUNTERSURVEILLANCE: THE U.S. ARSENAL

U.S. ASAT ENDEAVORS

Although the U.S. military strategy requires a capability for U.S. forces to control space and deny the enemy access to the space medium when necessary, the "space warfare arsenal" does not currently include an operational weapon which would be immediately available to destroy a satellite in space.

In 1959, the U.S. conducted the first test of an anti-satellite (ASAT) device. Although that ASAT program did not proceed to deployment, by 1964 the U.S. had an operational ASAT system using ground based missiles on Johnston Island in the Pacific. The system was decommissioned in 1975, and in 1977 the military began development of an air-launched homing ASAT interceptor. Because of controversy in Congress, that system (an F-15 launched interceptor, successfully tested in 1985 against an old astronomy satellite) was terminated in 1988.[31]

Since 1988 the Department of Defense (DOD) has continued research on ASAT systems and the U.S. Army Strategic Defense Command is developing a three-stage ASAT rocket to begin testing in 1996. Various other ASAT technologies are also being proposed as spin-offs from the Strategic Defense Initiative (SDI). (It has often been noted that it is technologically much less complicated to shoot down a low-earth orbiting satellite in an easily predicable orbit than a deluge of ballistic missile

warheads and decoys.) While much of the U.S. ASAT effort was originally dedicated to countering a Soviet reconnaissance threat from space, it is now being reoriented to other potential enemies who might launch advanced imaging satellites to gain a wartime advantage.[32] Nevertheless, congressional ASAT critics continue to debate whether the weapon is needed.[33]

Despite their lack of a "silver bullet" to defeat enemy satellites, space warriors can still bring the theater operational commander a myriad of options to counter enemy space surveillance systems. Those systems/warfighting options which are presently available or under development include those briefly described below.

-- **KINETIC ENERGY ASAT:** As mentioned above, the U.S. Army is developing a satellite "hard kill" capability by using ground based rockets which would launch an infrared or optical-tracking interceptor at an enemy satellite. Options include "direct kill" which would use an explosive warhead and scatter pieces of the destroyed satellite throughout the orbital plane, or a non-explosive interceptor which would impact the enemy satellite with sufficient force to destroy its sensitive electro-mechanical components and degrade its orbit, without the problem of space debris. Such a weapon would be capable against satellites in orbits up to about 2000 kilometers.

SDI researchers currently involved in developing U.S. Army and Navy capabilities for theater ballistic missile defense are also investigating ways to use these same systems to provide a

limited ASAT capability (e.g., the Navy's AEGIS/Standard Missile Upgrade and the Army's PATRIOT multi-mode missile or Extended Range Interceptor (ERINT) for use against a satellite).

The F-15/ASAT technology, currently "warehoused," could also be revived if deemed necessary.

-- **DIRECTED ENERGY ASAT:** Laser technologies are also being investigated for ASAT weapons. In 1988, DOD directed that the 2.2 megawatt laser in White Sands, New Mexico be converted for use as an ASAT weapon. This device would have only limited capabilities -- essentially the laser could "toast" the solar panels supplying energy to the enemy satellite. However, other SDI spin-off directed energy weapons are also under investigation as future ASAT systems.[34]

-- **JAMMING:** Jamming and/or interference with a satellite's command uplinks and data-stream downlinks is also possible. However, frequencies used for these transmissions are often in the SHF range, are very directional and have small footprints. Therefore, positioning a jammer with sufficient power to interfere with these signals might be difficult.

-- **DESTRUCTION OF GROUND SITES:** Satellites such as SPOT and LANDSAT (and those reconnaissance satellites likely to be developed over the next decade) often provide imagery direct to third-party users through a ground site located on that nation's own territory. Destruction of the ground site by conventional air strike or a special operations force (SOF) team should certainly be considered by theater commanders. All satellites

have a ground control segment -- if that site can be accessed and destroyed, often the threat posed by the satellite will also be eliminated (except in countries with sophisticated infrastructures, which may have developed mobile satellite control facilities). However, political considerations might make such an attack impossible, especially if the site providing the enemy support is located on neutral or friendly territory.

-- **DATA-FLOW INTERDICTION:** Operational planners should also give thought to locating and subsequently intercepting the flow of satellite-derived intelligence data to an unfriendly user. For example, if a commercial firm is delivering militarily useful data to a belligerent, interference with the transmission mode (e.g., truck, ship, air, facsimile) may be possible.

-- **NEGOTIATION/DIPLOMACY:** Often a belligerent's source of satellite-derived intelligence will be a country which can be influenced to cease such activity through diplomatic means. During the Gulf War, the allies were able to cease transmission of SPOT and LANDSAT imagery of middle east territory to users who might have provided the information to the Iraqis. However, such negotiations would become complicated if the entity providing the information was not a government agency, but a commercial firm. This problem was overcome during Operation Desert Storm, but space technology proliferation will muddle the issue in future conflicts.

-- **COVER AND DECEPTION:** Space operational planners should make use of their knowledge of the capabilities of the enemy's

satellites and predictability of the satellites' orbits to provide warning to friendly forces. Warnings of satellite "overhead" times (and collection capability of the satellite involved) will allow the troops, sailors and airmen in the field to tailor their activities in an effort to avoid exposing valuable information to the enemy's "spy in space." Further, planners should develop deceptive capabilities designed to confuse enemy intelligence personnel as to the actual disposition of friendly forces (e.g., use of inflatable/wooden decoys, smoke screens, radar reflectors, false signals, etc.).

While the space warrior's quiver may not contain all the arrows a theater operational commander may desire (especially in the case of "hard kill" weapons), those countersurveillance measures described above must be fully understood, carefully planned and thoughtfully executed to protect friendly forces when engaged against a belligerent.

CHAPTER IV

SPACE WARFARE AND THEATER DEFENSE PLANNING

SPACE WARFARE PLANNING

The cornerstone for U.S. success in any future conflict which involves an enemy with a space surveillance capability will be an effective space operational planning staff which can function across the operational (J3) and intelligence (J2) spectra to provide the commander with cohesive recommendations on how to employ space warfare assets, or other conventional forces which can be used in support of space warfare. A concept for designing a joint space operations doctrine for theater warfare planning may be built on the foundations of the newest U.S. Navy warfare area - Space and Electronic Warfare (SEW).

SEW: THE U.S. NAVY CONCEPT

In October 1989, the Chief of Naval Operations (CNO) established SEW as a warfare area to be implemented in the fleet. In a CNO message SEW was defined as "the neutralization or destruction of enemy targets and the enhancement of friendly force battle management through the integrated employment and exploitation of the electromagnetic and acoustic spectra and the medium of space." The SEW commander (SEWC) was subsequently assigned responsibility to four broad areas:

-- Aggressive management of the electromagnetic spectrum in support of all warfare areas.

-- Maximum degradation of enemy electromagnetic capabilities while enhancing own force survivability.

-- Management of tactical threat information collected by Battle Group/Force organic and non-organic sensors.

-- Tactical recommendations to the Officer-in-Tactical Command (OTC), the Composite Warfare Commander (CWC) and other warfare commanders, based on fused, timely indications and warning (I&W) and targeting information.

These wide-ranging responsibilities defined for the tactical naval commander could be successfully transferred to the joint operational level of war. Indeed, it can easily be discerned that under the Navy's concept, space countersurveillance would fall under the umbrella of SEW, if it was conducted at the tactical level. Further, SEW is a warfare area that in most future scenarios will extend beyond the Navy, requiring continuity of planning and action across the echelons and the components. In a joint environment, Navy SEW would necessarily be coordinated with and subordinated to the larger effort. SEW will be conducted and coordinated both vertically from the theater commander through the tactical commander, and horizontally across the operational and tactical components of the force.[35]

SPACE: A NEW JOINT COMPONENT COMMANDER

A Desert Storm veteran, General Charles A. Horner (now Commander-in-Chief of the United States Space Command

(USSPACECOM) admits he went to war in the Gulf (as the theater air component commander) knowing almost nothing about space, and he had to learn it literally from the ground up. He found out the hard way what space could and could not accomplish to help win the war.[36] General Horner's experience in that conflict, the first "space war" led him to conclude that "what we have to do, is change our emphasis from strategic war to theater war." Additionally, he says space personnel "need to be on the staffs" of warfighting commands "to bring an awareness of space to the guys who drop the bombs, shoot down the airplanes, and drive the ships."[37]

Such conclusions from a warfighter and the "Space CINC" strongly suggest that in future joint operational warfare involving component commanders (Air, Ground and Naval), space must find itself represented. The "fourth" medium of warfare, that environment fought in for the first time in Operation Desert Storm, must have as its ambassador an equal component commander in the next major regional contingency (MRC) involving space. In such a "grand" concept, the Joint Force Space Component Commander's (JFSCC) organization might be administratively structured similar to the Joint Force Air Component Commander (JFACC) successfully used during Operation Desert Storm. Because its scope (number of assets controlled, airspace safety requirements, etc.) would be somewhat less than the JFACC, the JFSCC would involve fewer personnel and equipment to accomplish its mission. The JFSCC is envisioned as a "one-stop shop" for

subordinates to coordinate space warfare requirements and actions through. As a goal, the JFSCC would seek to publish its version of a daily Air Tasking Order (ATO)-like document, tailored towards control of theater joint forces/assets involved in space warfare and dissemination of relevant data on the status of U.S. space support assets.

JFSCC: THE OPERATIONAL LINK

The objective of the JFSCC concept is to link the space-related requirements of the tactical users to the strategic space warfighting objectives delineated in the National Military Strategy. The JFSCC would be the intermediary, consolidator and facilitator which has been lacking vis-a-vis space support in past U.S. military operations. The following illustrates how the JFSCC would link the end user back to the space asset controllers for each of the four tasks assigned by the National Military Strategy to space forces:

-- **SPACE CONTROL:** Defined as combat against enemy forces in space and their infrastructure, the JFSCC would coordinate and direct attacks against enemy satellites with theater assets (ERINT/Aegis Standard Missile upgrade) or against enemy satellite ground control facilities using options discussed in Chapter III. Space control is the primary objective of the space counter-surveillance theme presented throughout this paper.

-- **SPACE FORCE APPLICATION:** Defined as combat against enemy land, sea, air and missile forces, space warriors currently lack

a tangible means of directly attacking belligerents from space. However, should SDI become a reality, the JFSCC could certainly become involved in applying theater and space-based defensive weapons against attacking enemy ballistic missiles, as currently envisioned in evolving theater ballistic missile defense (TBMD) plans. Additionally, the future may present opportunities to deploy conventional weapons in space which could directly attack enemy assets on the battlefield. Treaty limitations currently only limit the deployment of weapons of mass destruction in space; nevertheless, political sensitivities could breed significant opposition to such a development.

-- **SPACE FORCE ENHANCEMENT:** Defined as support for land, sea and air forces, this is the current lifeblood of the space warrior. The JFSCC concept offers a significant opportunity to improve the current haphazard procedures for requesting space support. By consolidating expertise under a single component commander one voice will speak for the tactical user up the chain to the satellite "owners and operators." This function would necessarily include requests for intelligence satellite support available through the tactical exploitation of national capabilities (TENCAP) program, and requests for support from communications satellites, weather satellites, navigation satellites and early warning satellites (such as the Defense Support Program (DSP), used in Operation Desert Storm to provide warning of SCUD attacks).

-- **SPACE SUPPORT:** Defined as satellite control and launch

capability, the JFSCC would be equipped to remotely receive and, in some cases, control U.S. space assets through the use of mobile ground sites. This capability currently exists for some U.S. satellite systems, and in fact was utilized during Operation Desert Storm to enhance space support for tactical commanders. For those satellites which do not have mobile ground sites, JFSCC personnel could be sent to the U.S. or overseas satellite ground stations to directly represent the needs of the theater commander. Additionally, long range U.S. defense planning foresees the development of relatively low-cost reconnaissance satellites designed specifically for launch and control of theater commanders -- another function the JFSCC would assume.

JOINT SPACE OPERATIONS PLANNING

For the operational level commander, USSPACECOM should build on and adapt the U.S. Navy's SEW concept/doctrine and U.S. Air Force's JFACC organization/structure to develop a Joint Space Operations Planning Cell (JSOPC). This cell would function across the J2 and J3 organizations to ensure the proper and efficient execution of space warfare and related disciplines. The JSOPC would function as the basis for the staff of a JFSCC. If adapted, the JSOPC organization would not by design include all of the information management, tactical electronic warfare coordination, or acoustic spectra manipulation that are encompassed by the Navy's SEWC, except where those specific warfare areas are influenced through the use of space warfare

assets. However, assigned personnel would be well versed in operational areas closely related to space to facilitate asset management and ensure economy of force (e.g., use of tactical and strategic air-breathing reconnaissance platforms where space assets might be inappropriate).

Personnel assigned as operational "space warriors" would include those from the specialties of communications, intelligence, cryptology, electronic warfare, tactical/strategic reconnaissance, engineering and space operations and additionally experienced operators from the ground, naval and air services. A substantial cadre of these individuals should be established, trained and exercised at USSPACECOM for deployed operations involving different scales of force employment. For a lesser regional contingency (LRC) on the scale of Grenada where a Joint Task Force (JTF) staff of 50-100 personnel might be formed, perhaps only a small space warfare augmentation cell (mini-JSOPC) would be required. In an MRC such as Operation Desert Storm, a complete JSOPC staff for component commander operations would be necessary.

The national mission of "space control" that might well be delegated to the operational level in a future war can only be properly accomplished by theater commanders if actions are taken now to establish space warfighting doctrine and designate, train and equip space fighting forces to support CINC regional contingency planning and operational missions. Space countersurveillance, because of its impact on the commander's

ability to operationally maneuver, will necessarily be a major element of that doctrine.

CHAPTER V

CONCLUSIONS

THE U.S. MUST PREPARE NOW FOR TOMORROW'S WAR

Space countersurveillance is necessary to ensure execution of U.S. military strategy. Today, operational commanders do not possess adequate means to ensure U.S. forces control the use of space. The space surveillance threat to U.S. operational forces is not shrinking, but expanding at an alarming rate. According to the former director of U.S. Naval Intelligence, RADM Thomas Brooks, "any country that desires to have a space-based reconnaissance program can acquire one over the next decade."[38] U.S. officials warn that nations have learned from operation Desert Storm that remote-sensing satellites are vital for modern warfare and argue that the U.S. must have a satellite-killing weapon to tip the scales back in its favor.[39] Thus, while the threat to U.S. dominance in space appears to be inevitable, that threat can be managed if measures are taken now to plan for the next war.

Organizationally, measures can be taken to increase the effectiveness of the U.S. military space establishment. Space warriors must be organized into joint, knowledgeable and effective deployable teams to support subordinate units in a theater-of-war environment. These teams will inform and advise operational theater commanders of the arsenal available to them to defeat the enemy's "eyes in space" through different

countersurveillance options, and manage each theater's "war in space."

Additionally, and in a broader scope, space must be considered the "fourth" dimension for practicing operational warfighting -- and be given component commander status in the next MRC. Through thoughtful leadership, training and resource allocation today, there can be hope that the U.S. forces of tomorrow will unequivocally control the medium of space and use that control for achieving success on the battlefield.

NOTES

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8. Marc J. Berkowitz, "Future U.S. Security Hinges On Dominant Role in Space," Signal, May 1992, p. 71.

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33. Ibid., pp. 14-15.

34. Colin Norman, "Army, Air Force Eye SDI Spinoffs," Science, March 16, 1990, p. 1284.

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